

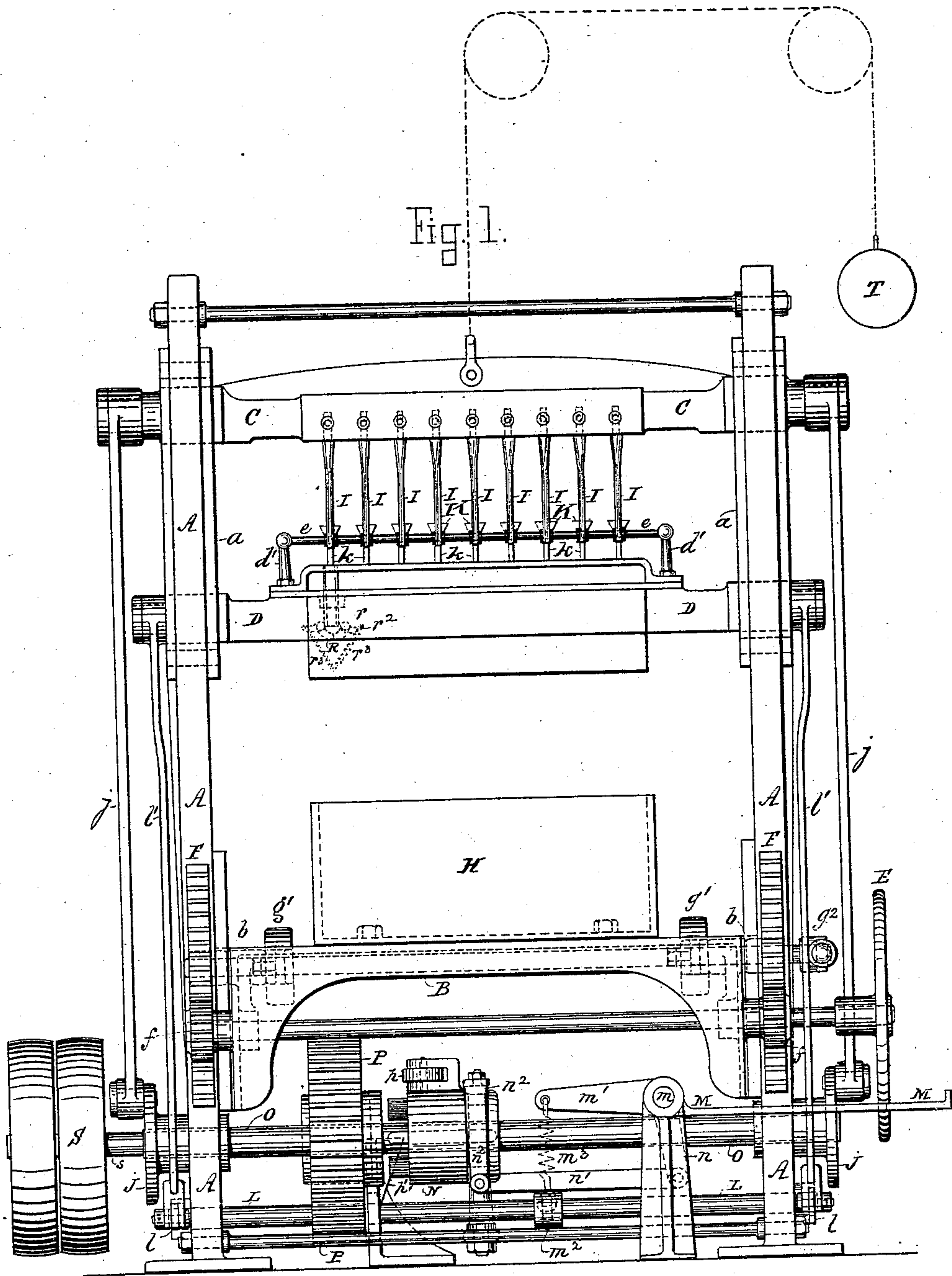
(No Model.)

7 Sheets—Sheet 1.

F. W. BLOOD.  
BOX NAILING MACHINE.

No. 272,199.

Patented Feb. 13, 1883.



Witnesses.  
Jas. F. Duffanell  
Walter S. Dodge.

Inventor.  
Frederick Walter Blood,  
by Dodge & Co. Attys

(No Model.)

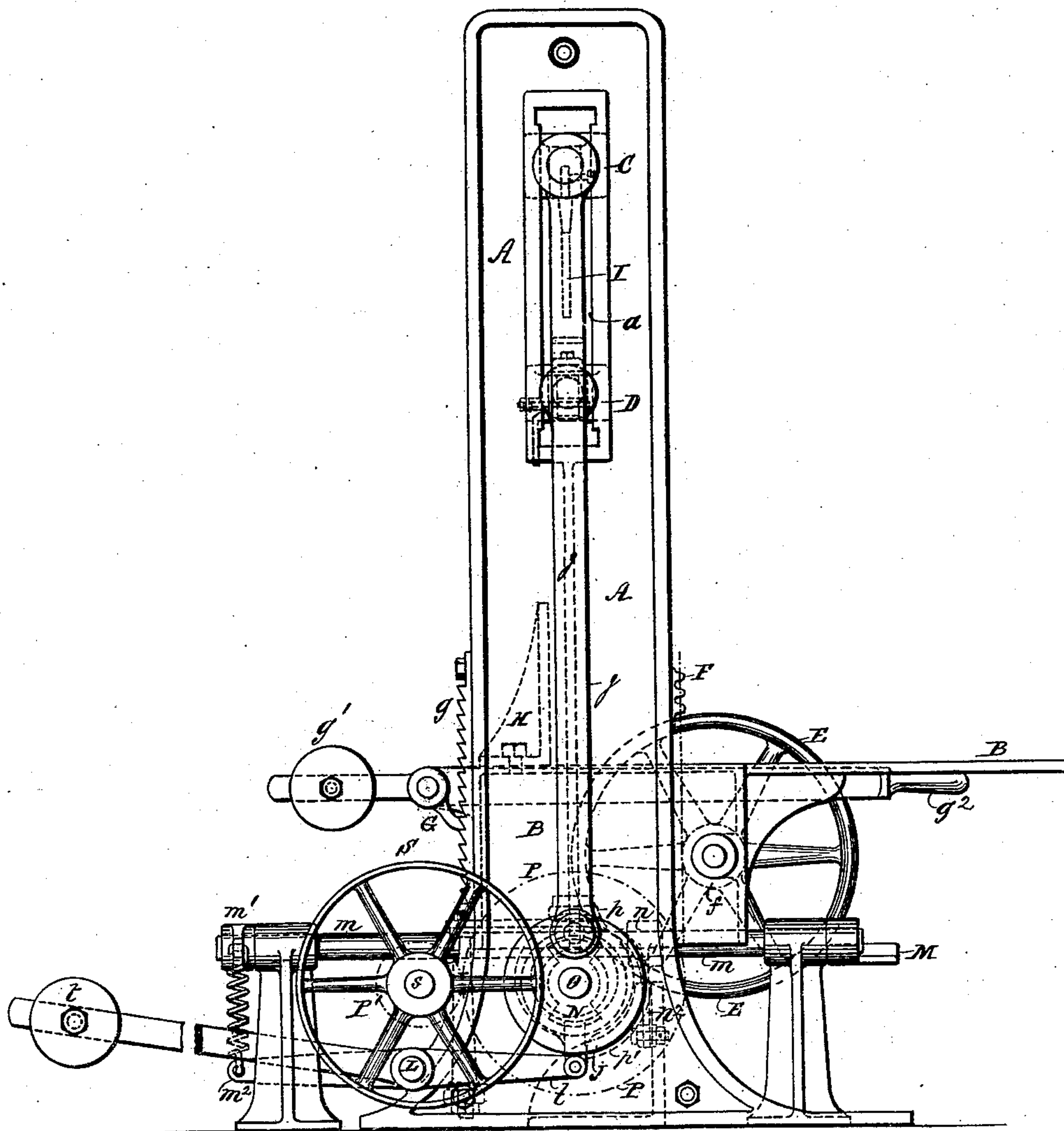
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Fig. 2.



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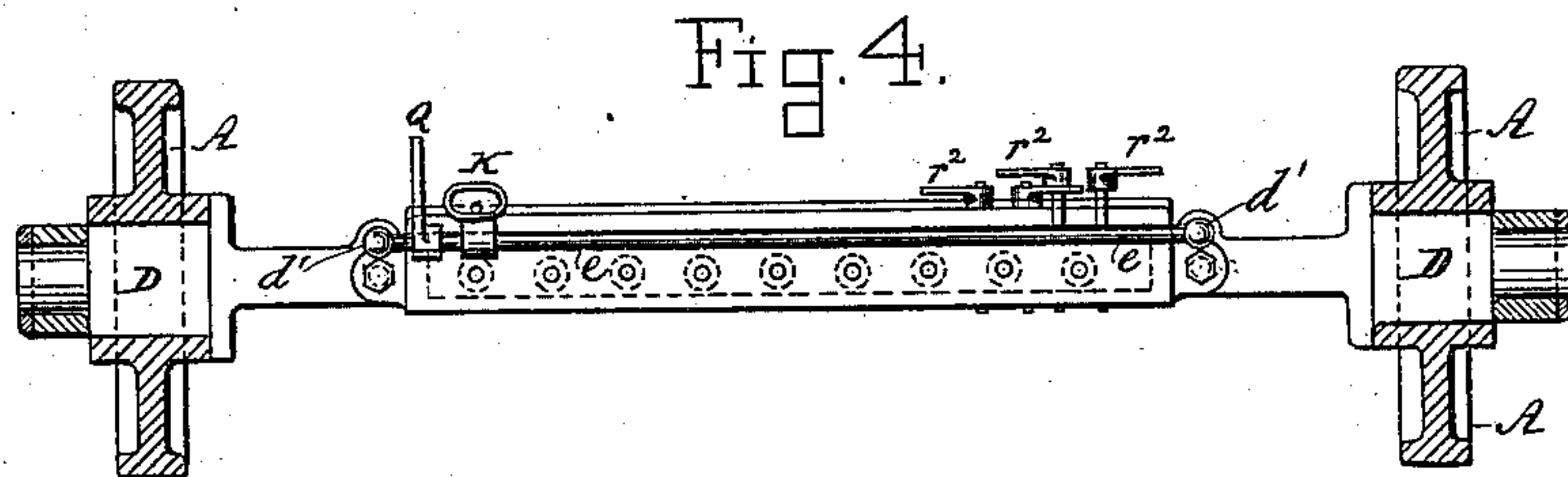
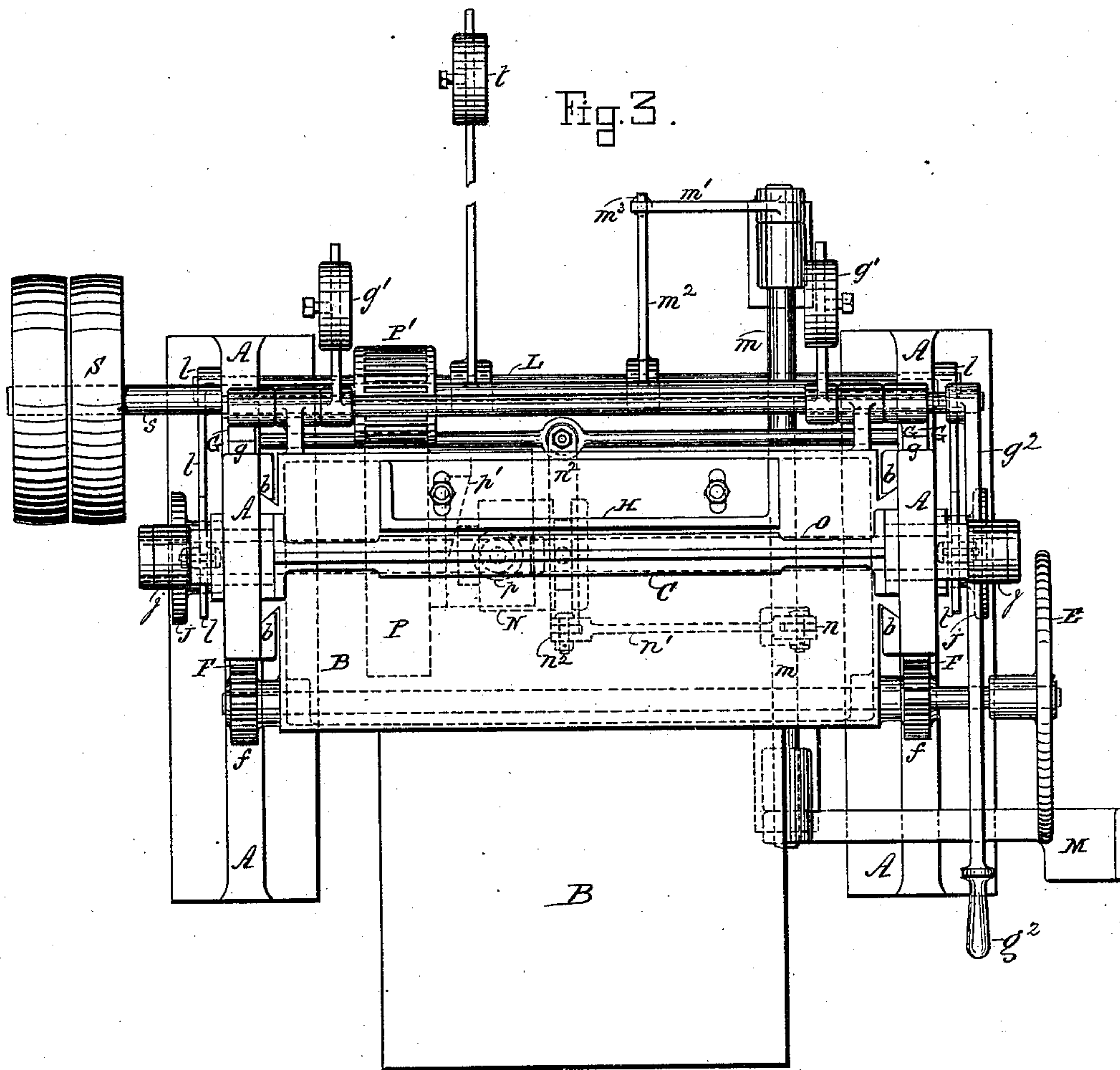
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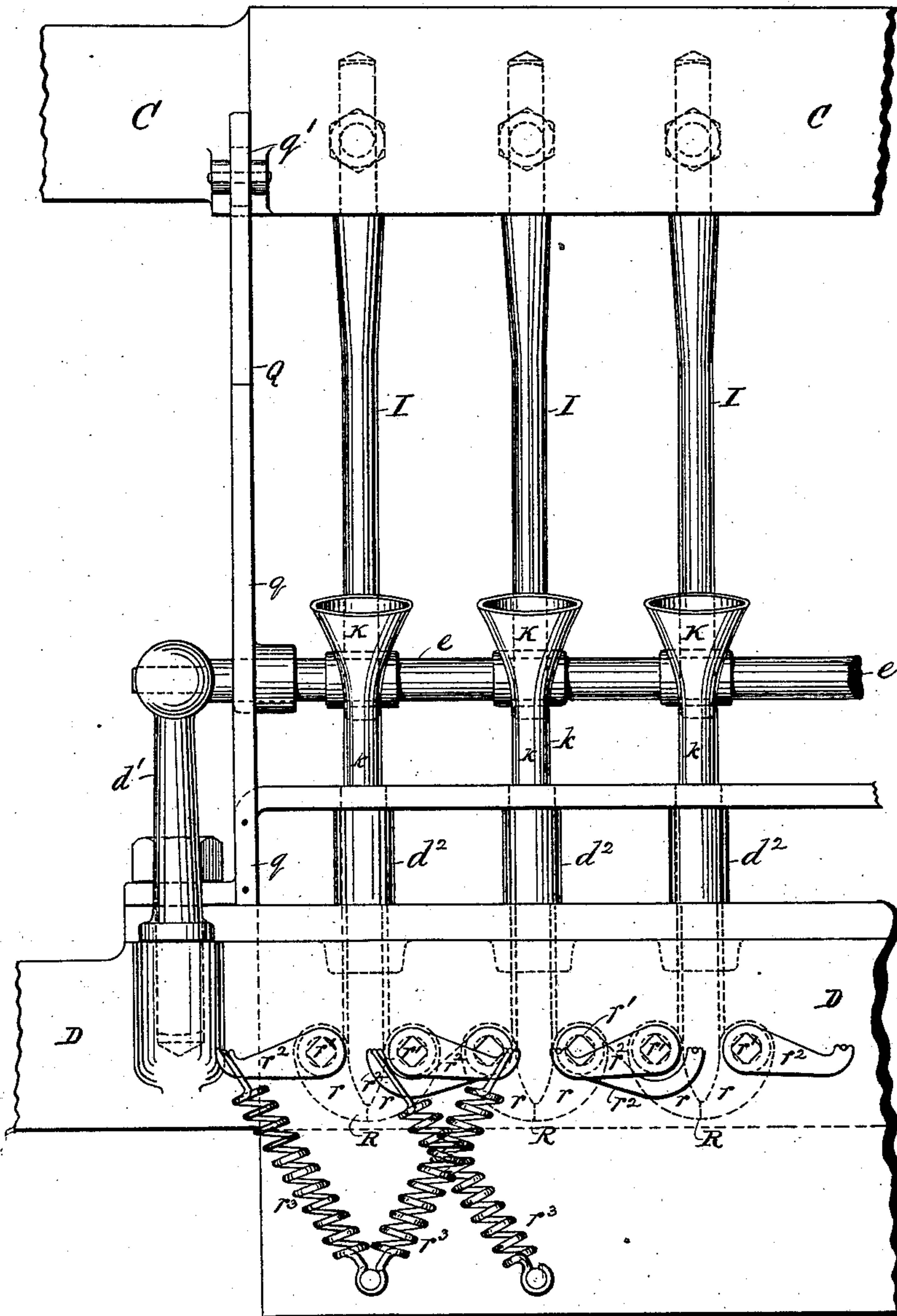
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Fig. 5.



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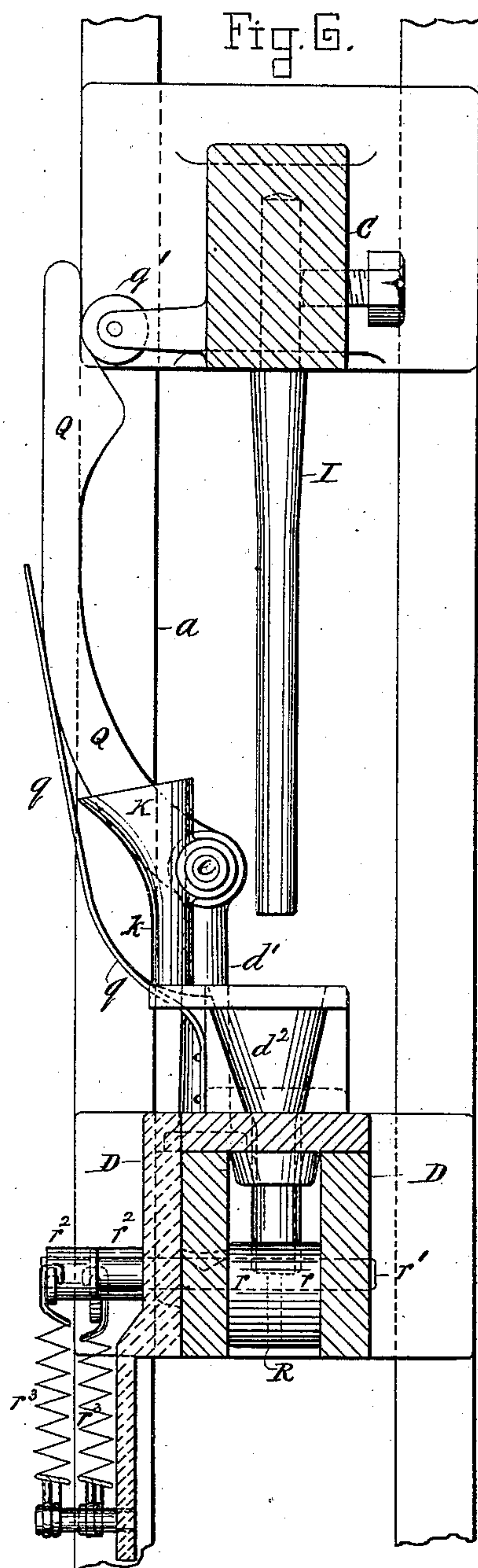
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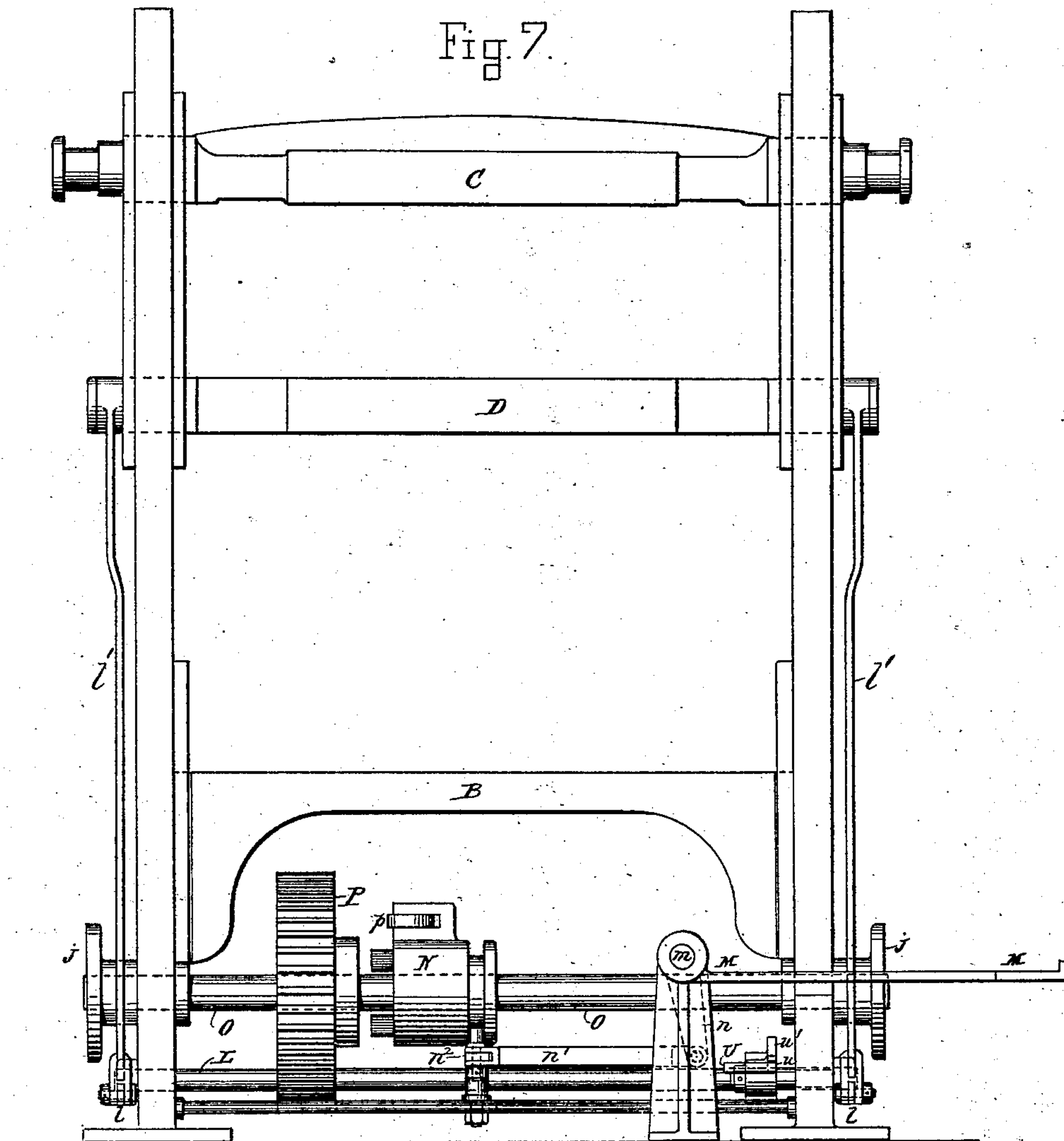
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(No Model.)

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Fig. 8.

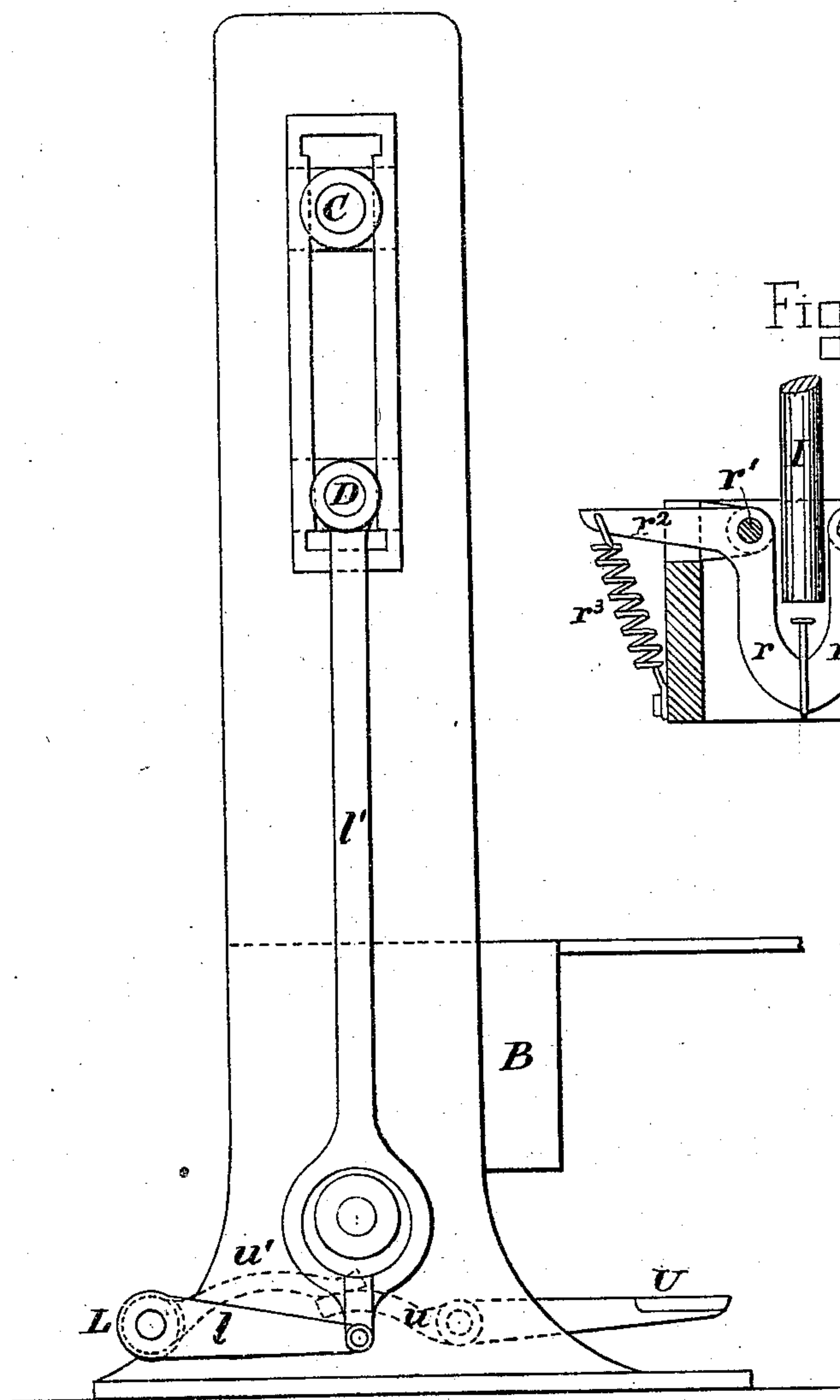
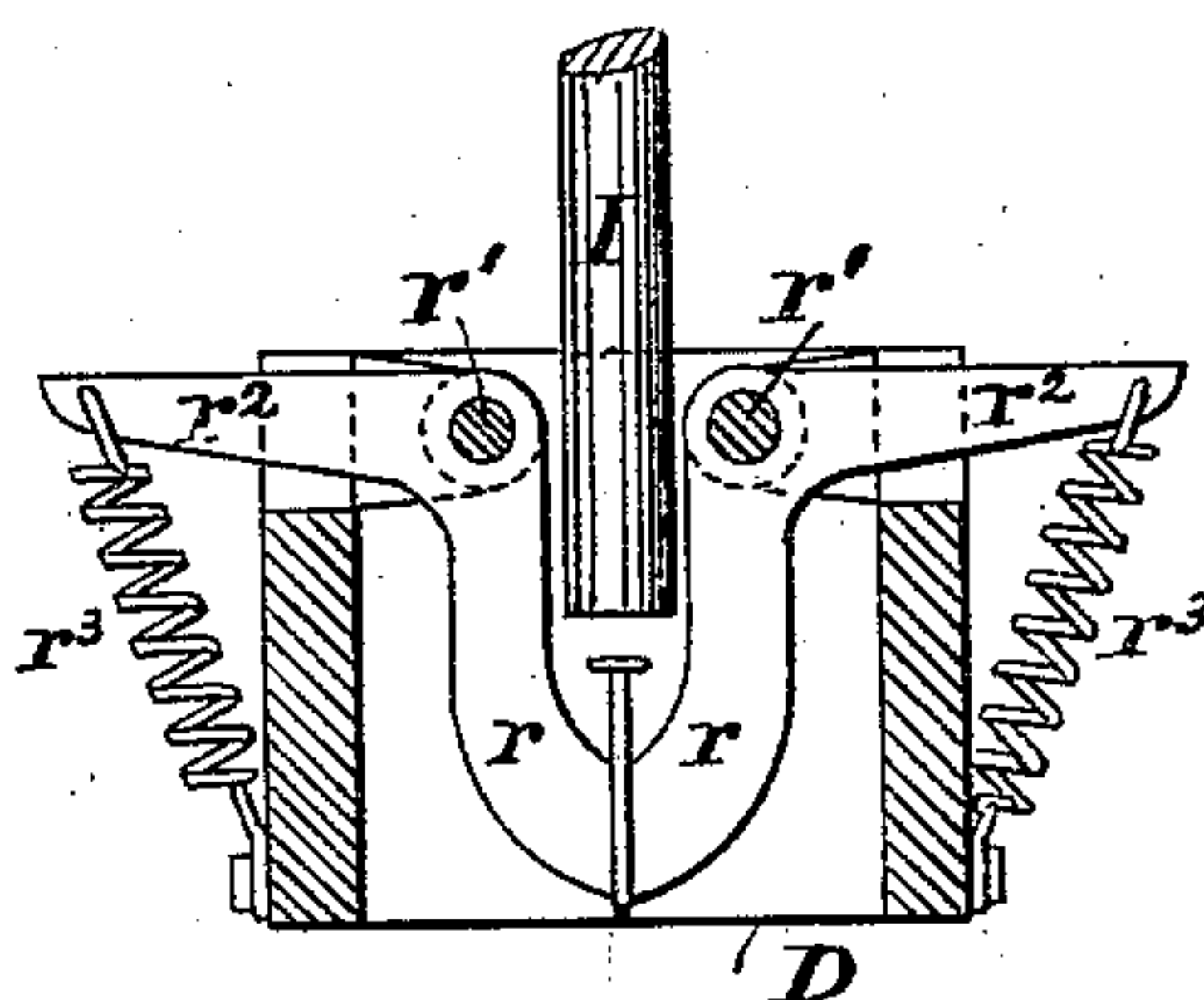


Fig. 9.



Witnesses.

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Inventor.

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# UNITED STATES PATENT OFFICE.

FREDERICK WALTER BLOOD, OF LIVERPOOL, COUNTY OF LANCASTER,  
ENGLAND.

## BOX-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 272,199, dated February 13, 1883.

Application filed August 1, 1882. (No model.) Patented in England November 12, 1881, No. 4,961.

*To all whom it may concern:*

Be it known that I, FREDERICK WALTER BLOOD, a subject of the Queen of Great Britain, residing at Liverpool, in the county of Lancaster and Kingdom of Great Britain, have invented new and useful Improvements in Box-Nailing Machines, (for which I have obtained a patent in Great Britain, No. 4,961, bearing date November 12, 1881,) of which the following is a specification.

My invention relates to box-nailing machines; and it consists in various features and details hereinafter fully explained.

In the accompanying drawings, Figure 1 represents a front elevation of my improved machine; Fig. 2, a side elevation of the same; Fig. 3, a top plan view; Fig. 4, a plan view of the nail-holder cross-head. Figs. 5 and 6 are enlarged detail views; and Figs. 7, 8, and 9, views illustrating certain modifications.

The objects of my invention are to produce a machine which shall be adapted for nailing boxes of various sizes, and to simplify and improve the general construction of the machine. With these purposes in view I construct my machine in the following manner.

Referring again to the drawings, A represents a supporting frame-work or housing, provided with slots *a*, having polished cheeks to receive the sliding cross-heads C and D, the former carrying the nail-drivers and the latter the nail receivers or holders. As shown in Figs. 1, 2, 7, and 8, the ends of both cross-heads C and D are carried through and project beyond the slots *a* of the machine, the ends of cross-head C projecting beyond the ends of cross-head D, in order that rods may be connected to the ends of both cross-heads, and carried downward to operating mechanism without interfering with each other.

B represents the box-supporting table, carried by V-shaped or beveled slides running in upright ways or guides *b* in the frame A. In order that the table may be readily adjusted to any required height to suit the work, the frame A is provided with a rack or racks, F, into which mesh or engage pinions *f*, secured upon a cross-shaft journaled in arms or brackets attached to or formed upon the under side of the table, said shaft being furnished with a hand-wheel, E, by which it may be rotated

to raise or lower the table. The table is held at any desired height by means of pawls G, provided with counter-weights *g'*, which cause the noses of the pawls to engage and remain engaged in the teeth of a ratchet-bar, *g*, attached to or formed upon the frame, as more plainly shown in Fig. 2. The pawls G are keyed upon a cross-shaft, which is furnished with a hand-lever, *g''*, by which the pawls may be readily and simultaneously disengaged from the ratchets when it is desired to lower the table. In some cases, and particularly in light and small machines, the rack-and-pinion mechanism for raising and lowering the table may be omitted and the adjustments effected by hand only.

The rack *g* may be made separately and bolted to the frame, or cast thereon, or notches or grooves may be formed in the frame at stated heights corresponding to the regular sizes of boxes.

In order to insure the proper placing of the boxes upon the table, so as to bring the line for nailing directly beneath the nail holders and drivers, I provide the table B with an adjustable gage or back plate, H, which, being once set, remains fixed during the nailing of all the boxes of the size for which it is adjusted. The boxes or box parts, being placed upon the table, are drawn snugly against the gage, and thus the nailing is performed with certainty and accuracy at the required point or points.

The cross-heads C and D carry respectively the nail-drivers and the nail receivers or holders, and they are so arranged that the cross-head D may be first drawn down upon the box or the box material, and thus be made to hold the parts firmly in position, and then the cross-head C shall be caused to descend and drive the nails held by the nail receivers or holders.

To permit the action to be conveniently brought about, the driving-shaft *s*, which is furnished with a fast and a loose band-pulley, as usual, is also provided with a pinion, P', which meshes with a gear-wheel, P, loose and free to rotate upon a shaft, O, which carries crank wheels or disks J, connected by rods J' to the cross-head C, so that when the shaft O rotates the cross-head will be caused to rise and fall. The hub or boss of wheel P is fashioned to



receive and lock or engage with a sliding clutch, N, arranged to be moved longitudinally upon shaft O through the action of a treadle, M, attached to a shaft,  $m$ , carrying an arm,  $n$ , which connects with the sliding clutch N through the medium of a connecting-bar,  $n'$ , and lever  $n^2$ , as more plainly shown in Fig. 1. The shaft  $m$  also carries an arm,  $m'$ , which is connected with a lever,  $m^2$ , by a spring,  $m^3$ , as shown in Figs. 1 and 2, said lever  $m^2$  being rigidly secured to a shaft, L, carrying arms or levers  $l$ , which are connected by rods  $l'$  to the cross-head D.

The parts being thus constructed and arranged, it will be seen that by pressing with the foot upon treadle M the cross-head D will be drawn down upon the box placed upon table B through the joint action of rods  $l'$ , levers  $l$ ,  $m^2$ , spring  $m^3$ , arm  $m'$ , and shaft  $m$ , the spring affording an elastic pressure, and also permitting the shaft to be turned farther after the cross-head D has been drawn down upon the box. The further turning of the shaft  $m$  causes arm  $n$  to swing forward, and, through connecting-rod  $n'$  and lever  $n^2$ , to move the clutch N into engagement with the hub or boss of continuously-rotating wheel P. As the shaft O is thus put in motion, the clutch N being prevented from turning independently thereof, the disks J are rotated and the cross-head C is suddenly drawn down, driving the nails into the box and flush with its face. Thus a simple pressure upon the treadle M causes the cross-head D to first descend and clasp or hold the box or parts, and then the cross-head C to descend and drive the nails through the holders carried by cross-head D. The cross-head or frame D carries shaft  $e$ , on which are mounted the nail-feeders K, and said cross-head also carries the nail-holders R, as shown in Fig. 5. K indicates the nail-feeders, consisting of a series of tunnel-shaped tubes,  $k$ , secured upon a common shaft,  $e$ , which latter carries an arm, Q, having a double incline upon its upper end, as shown in Fig. 6, and normally pressed forward to the position shown in said figure by a spring,  $q$ , as shown. When in said position, and before the nail-drivers I descend, the tubes  $k$  are supplied by hand each with a nail. As the cross-head C descends an arm or roller,  $q'$ , acts upon an arm, Q, throwing it outward or backward, partially rotating shaft  $e$ , and swinging the lower ends of the tubes or funnels  $k$  over the nail-holder openings  $d^2$ , whence they pass down to the nail-holders B, followed and driven downward by the nail-drivers I in their further movement. As the arm or roller  $q'$  passes the incline the nail-receivers K swing backward to their first position, their lower ends standing over a plate or ledge, as shown in Fig. 6, which prevents the nails from dropping out until the tubes are swung forward over the openings  $d$ , as mentioned.

The nail receivers and holders R are below the nail-feeders, and are carried by the cross-head D. They consist each of two jaws,  $r$ , cut out on their opposing faces, so as to form a

space or opening between them of parabolic or conoidal form, continuing down to a circular hole at the lower end to receive the point of the nail. Each jaw is hung upon a pivot or spindle,  $r'$ , independent of the others, each spindle being furnished with an arm or lever,  $r^2$ , to which is attached a spring,  $r^3$ . The springs hold the jaws normally in contact to prevent the nail from dropping down; but the jaws may be separated by merely overcoming the tension or force of the springs. As the nail-drivers descend they force the nails before them to drive the nails flush with the side or face of the box. As the nail-drivers rise and pass above the nail holders the jaws of the latter again come together by reason of the action of the springs, ready to guide fresh nails. The wheel P, as before stated, imparts motion to the cross-heads C D, or permits the same to remain out of operation, according to the engagement or disengagement of the clutch N therewith or therefrom, the engagement being effected by pressure upon the treadle M.

The disengagement or retraction of clutch N is effected by means of a fixed incline or track,  $p'$ , which is arranged in the path of a roller,  $p$ , journaled in the clutch N, so that as the clutch rotates the roller  $p$  rides upon and is pressed back by the incline, carrying the clutch N with it and away from wheel P, thus rendering the disengagement automatic and causing the cross-heads to go out of action after one driving operation and to remain out until the operator again depresses treadle M. Counterweights T  $t$  return the cross-heads C D to their elevated or first position.

Other forms of clutch mechanism may obviously be adopted—such, for instance, as the well-known friction-clutch; and it is also obvious that, instead of connecting the treadle M through intermediate levers with a rearwardly-projecting arm on shaft L to depress the cross-head D, a forwardly-projecting treadle,  $u$ , may be attached to the shaft for that purpose, the operation of the cross-head through the rotation of said shaft being accomplished in the same manner in both cases, but the treadle in one case acting indirectly through intermediate connections and in the other case acting directly upon said shaft.

In some cases adjustable connecting-rods  $j$  and  $l'$  may be employed to regulate the movements and positions of cross-heads C and D, so as to suit boxes of various sizes, and the back plate attached to table B may be made to rise and fall for the same purpose, though in the drawings I have shown only the table B and back plate, H, adjustable.

I am aware that gages have before been applied to this class of machines to insure the proper placing of the parts to be nailed beneath the nail-drivers, and hence do not claim such.

I claim as my invention—

1. The combination of the slotted frame-work A, table B, carried thereon, and sliding cross-



heads C and D, extending through and sliding independently in the same slot, substantially as and for the purpose specified.

2. In combination with frame A, having racks F and g, pawl G, and pinion f, carried by a shaft provided with a hand-wheel, E, substantially as shown.

3. The combination of the reciprocation nail-holder cross-head D, the shaft e, supported thereon and traveling with it, and the nail-feeders K, pivoted to the shaft and traveling with it, so that their relative distance from the nail-feeders shall remain approximately the same.

4. In a box-nailing machine substantially such as described, the combination, with cross-head D, of the lifting mechanism, consisting of treadle U, having finger u, the lever w', and shaft L, lever l, and connecting-rod l'.

5. In a nailing-machine, the combination of a stationary table supporting the box, a cross-head above the table, and means, substantially such as shown and described, to draw and hold the cross-head firmly down upon the box, thus holding it in position, and a nail-driving mechanism driving the nails while the box is thus firmly held.

6. In a nailing-machine, the combination of a nail-holder, a nail-receiver pivoted above the nail-holder, and provided with lever Q, having an inclined face, and a reciprocating nail-driver adapted to strike and move the lever, and thereby to rock the nail-holder upon its pivot, substantially as shown and described.

7. The combination of the wheel or tappet q' on the nail-driving mechanism, cam-lever Q, and nail-holder K with the pivot e, substantially as and for the purposes described.

8. In combination with the nail-holder cross-head D, driving-shaft O, and clutch N, adapted to connect the shaft and the driving mechanism, treadle M, arranged substantially as shown and described, whereby it is adapted first to actuate the nail-holder cross-head and then to shift the clutch.

9. In a nailing-machine, the combination of the treadle M, clutch N, spring-gearing P, nail-driving mechanism C, pulley p on the sliding clutch, and the incline p', substantially as and for the purpose set forth.

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